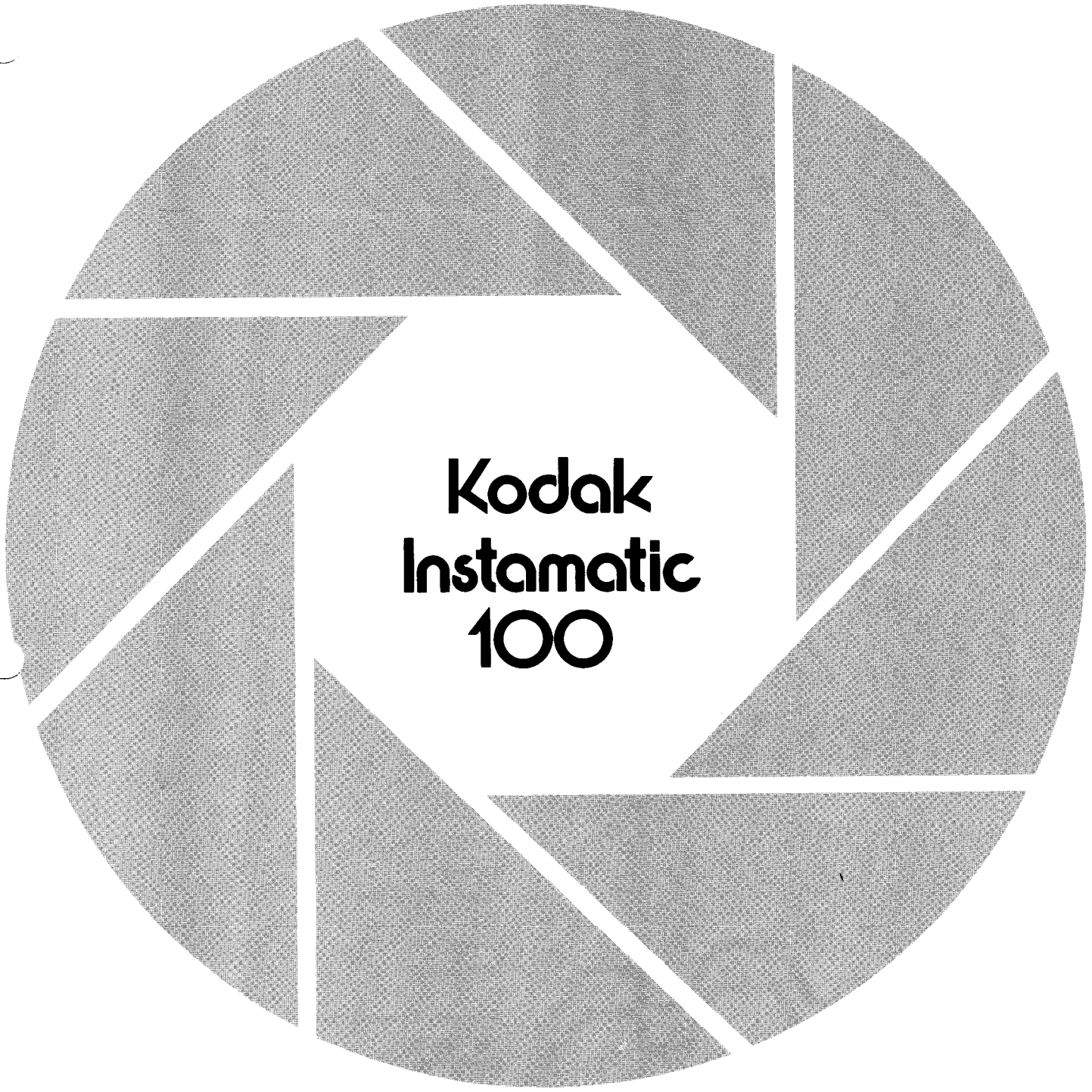

Kodak
Instamatic
100

Author
Eugene C. Fowler

Design
Ivan Bardon

Advisory Committee
Jim Amos
Metro Camera Service

Doug Donaldson
Western Camera

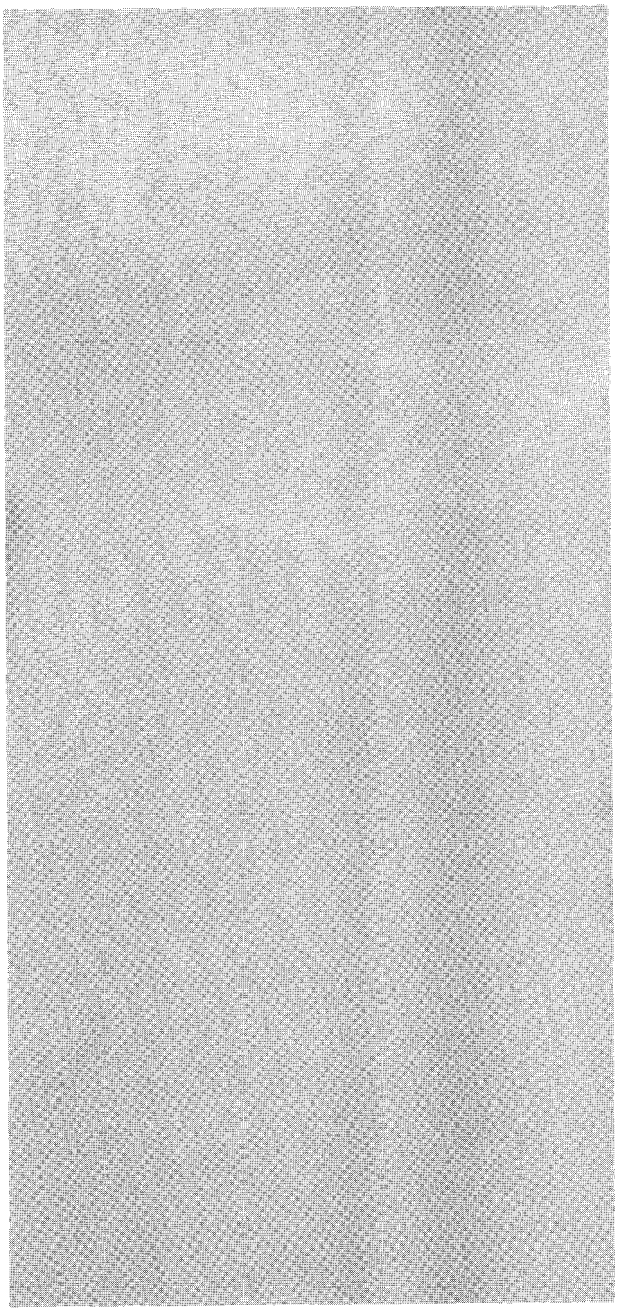
Bill Glennon
Lindahl Camera

Mike Lowe
Rocky Mountain Camera Repair

Kodak Instamatic 100

contents

1 CAMERA DISASSEMBLY
3 SHUTTER OPERATION
5 FLASH SYNC
5 FILM ADVANCE MECHANISM
6 PRACTICE MECHANISM DISASSEMBLY
10 PRACTICE MECHANISM REASSEMBLY
12 CAMERA REASSEMBLY
12 SERVICING TIPS



1098

©Copyright 1978

National Camera, Inc.
Technical Training Division
2000 West Union Ave. Englewood CO 80110 USA

Figure 1

You have already read about the unprecedented popularity of the 126 and 110 cartridge-load cameras. Because of its larger size and simplicity of design, the 126 Instamatic in particular makes an ideal first camera for your study. The practice mechanism you have received with this lesson is the shutter and wind assembly from a Kodak Instamatic 100. This text supplement will cover the complete camera disassembly up to and including the practice mechanism.

CAUTION:
Do NOT attempt to operate this mechanism until you have read the following instructions. The reason will become obvious as you proceed.

The Kodak Instamatic 100 is little more than a box camera built around the cartridge-loading design. It does not have an exposure meter, and in fact, there is no exposure control. The diaphragm setting is fixed at f/11, insuring reasonable sharpness with the fixed-focus lens. There is only one instantaneous shutter speed, around 1/90 second, with an additional flash speed of 1/40 second when the flasholder is extended.

As is common in cameras of this type, the Instamatic uses a simple disc-type shutter. The Instamatic is set-and-release rather than automatic. That is, before the shutter can be released, it must first be set or cocked. This setting action is accomplished at the same time as the film is wound for the next exposure by one and one-half strokes of the wind lever. Since the film advance and double-exposure prevention mechanisms are integrated with the shutter operation, they will be described briefly here. However, these operations will be fully covered later in your course. Your chief concern at this time should be the shutter itself.

CAMERA DISASSEMBLY

Push up the latch on the side of the camera to open the back, Fig. 2. When the latch is moved in this direction, the plastic film driver, visible within the take-up cavity, is also moved vertically. This provides clearance for the new cartridge when loading the camera.

Figure 2

Kodak Instamatic 100

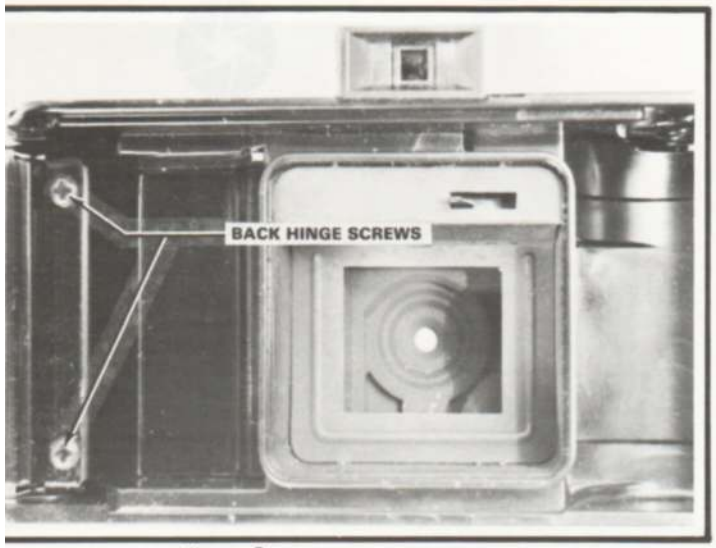


Figure 3

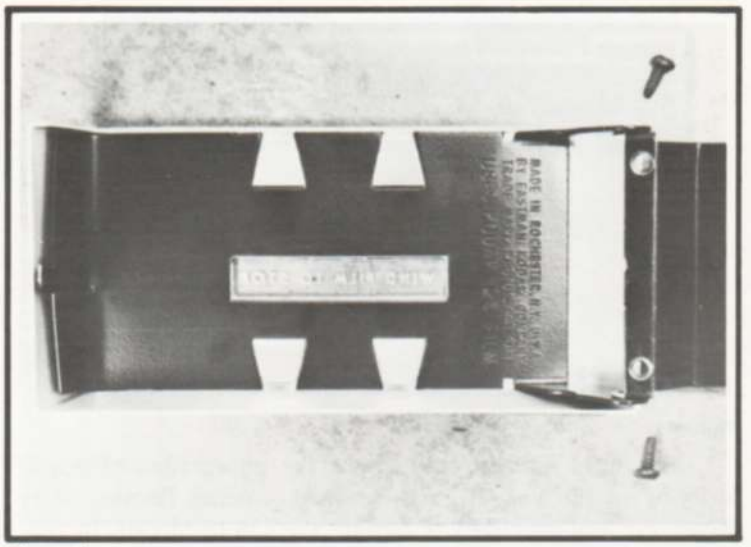


Figure 4

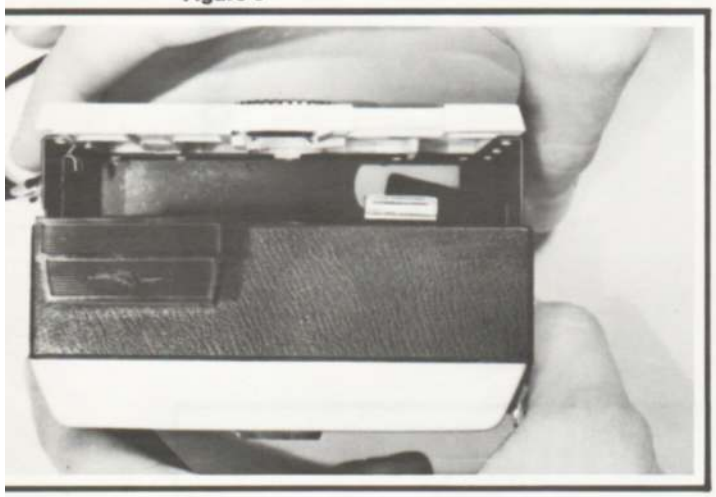


Figure 5

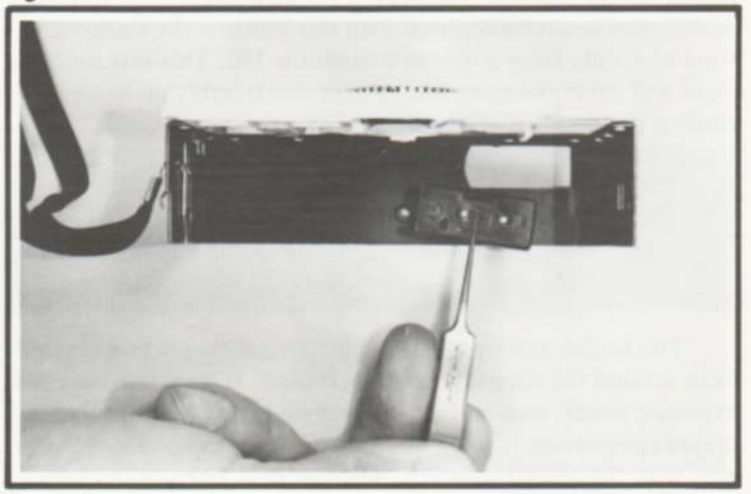


Figure 6

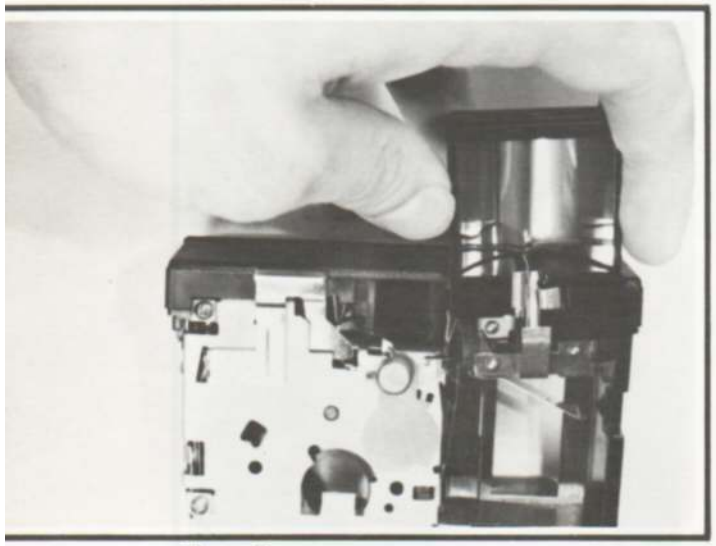


Figure 7

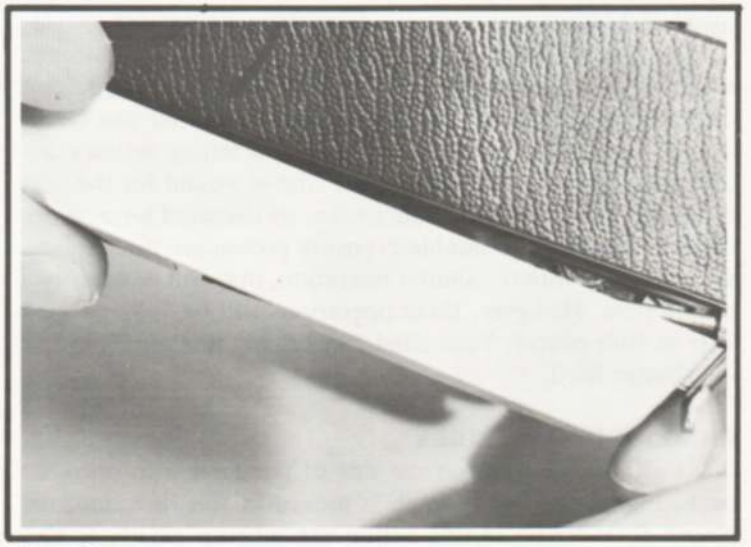


Figure 8

Place the camera on the workbench with the lens down and the back fully open. Note the two screws, Fig. 3, which secure the back hinge to the body. Using a Phillips-head screwdriver of the proper size, remove the two screws. The back and hinge assembly can now be lifted from the camera as a unit, Fig. 4.

Four screws retain the entire front assembly to the body. Remove the screws on each side of the camera (one near the latch and one near the hand strap) and the screw on the bottom of the camera. The fourth screw is located inside the focal plane directly under the rear aperture. Be sure to note the respective sizes of these screws so they can be returned to their proper positions.

Before separating the front assembly from the body, depress the flasholder latch on the front of the camera to release the spring tension on the flasholder. Holding the camera in an upright position, gently pull the front assembly from the body, Fig. 5.

Two parts will now be loose within the camera. The battery case cover will remain with the front assembly and should be set aside to prevent loss, Fig. 6. The flasholder assembly, remaining with the camera body, can be pulled straight out toward the top of the camera, Fig. 7.

The aluminum rear top cover plate is cemented in position. Using the tip of a screwdriver or similar flat blade, gently pry off this cover, Fig. 8.

The two screws holding the top cover are now accessible, Fig. 9. Remove these two screws and lift off the top cover. The wind lever must be all the way toward the back of the camera to provide clearance.

CAUTION:
Do not invert the camera while removing the top cover. The rear viewfinder window fits in a slot in the body and can fall out unless the camera is held erect.

Hold your hand over the top of the viewfinder window while turning the assembly over, letting the window fall into your hand.

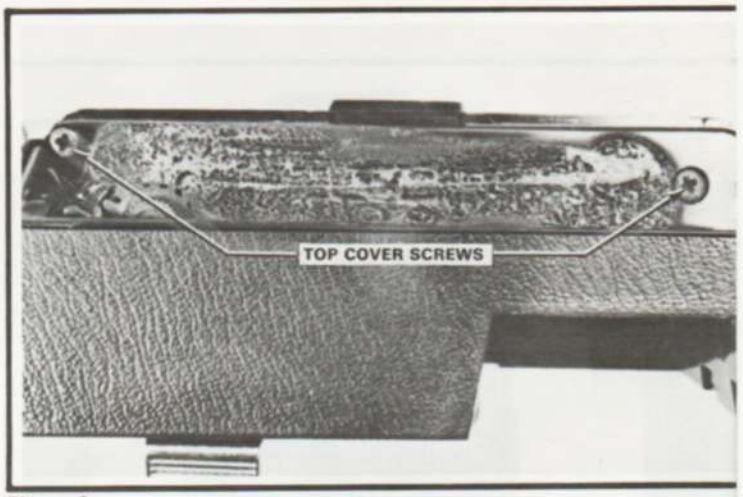


Figure 9

SHUTTER OPERATION

At this stage of disassembly, the shutter operation can be clearly observed. The Instamatic shutter is quite similar to the disc-type shutter you have already studied, Fig. 10.

You can now operate the practice mechanism which you received with this lesson. Cock the shutter by advancing the **wind lever** until it is stopped by the vertical lug on the mechanism plate. The large tension spring on top of the assembly will then return the wind lever to its normal position.

As the wind lever is turned, its lower extension contacts a vertical lug on the **main lever.** This moves the main lever to the cocked position where it is latched by a lug on the **release lever.**

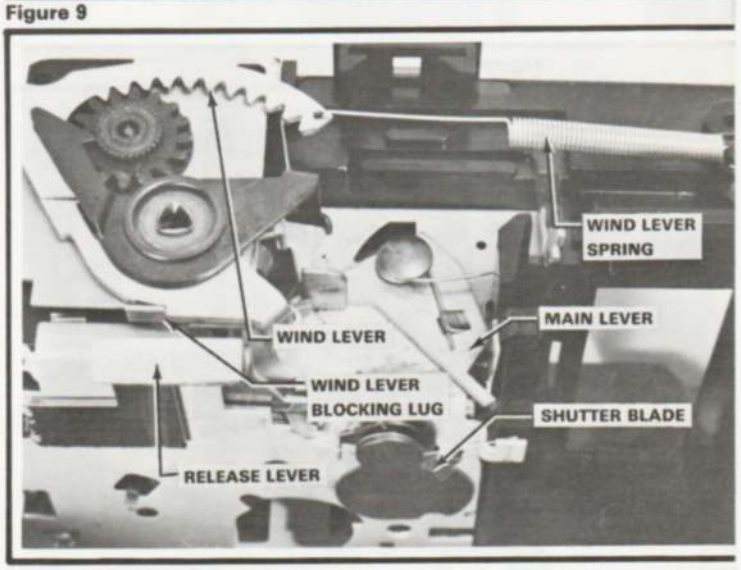


Figure 10

However, it is not yet possible to trip the shutter because the release lever is physically blocked.

In normal operation with the camera loaded, the sprocket holes in the film activate a lever to release a locking mechanism during the setting stroke. Part of this lever, the **perforation lever,** extends through the back of the camera just above the focal plane, Fig. 11. Simulate the action of the film at this time by pushing the perforation lever from left to right, the direction of film transit. When you hear an audible "click," the shutter can be released. Release the shutter by depressing the release lever.

Following this sequence, operate the shutter several times for familiarity. Cock the shutter by advancing the wind lever. Next simulate the action of the film by moving the perforation lever until the "click" is heard. Finally release the shutter by depressing the release lever.

As previously noted, there are two shutter speeds available, depending on whether or not flash is being used. The practice mechanism which you have received delivers an exposure of around 1/40 second, the flash speed. A higher speed, around 1/90 second, is attained by bringing an **auxiliary spring** into contact with the **shutter blade (disc).** Since this spring has no purpose without the flasholder assembly, it is not included with your practice mechanism.

When the flasholder is in the depressed position, it forces the auxiliary spring toward the shutter blade, Fig. 12. The main lever then opens the blade, the blade in turn tensioning the auxiliary spring. This extra tension is applied to the closing stroke of the shutter blade, increasing the closing speed.

Extending the flasholder allows the auxiliary spring to move away from the shutter blade, Fig. 13. In this position, the shutter blade spring acts alone to complete the exposure.

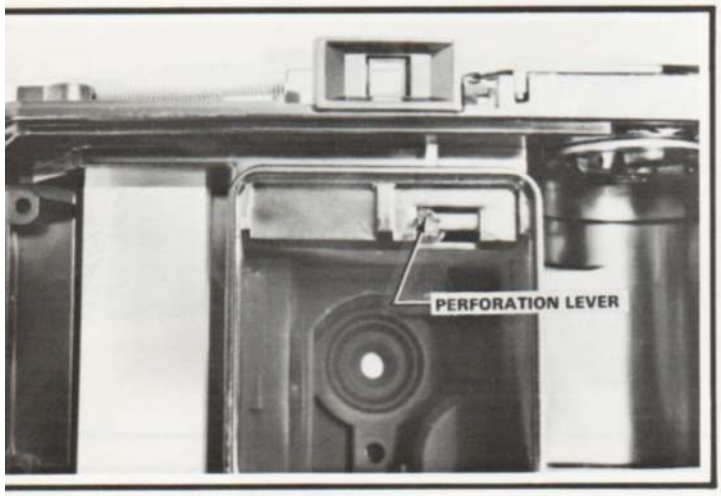


Figure 11

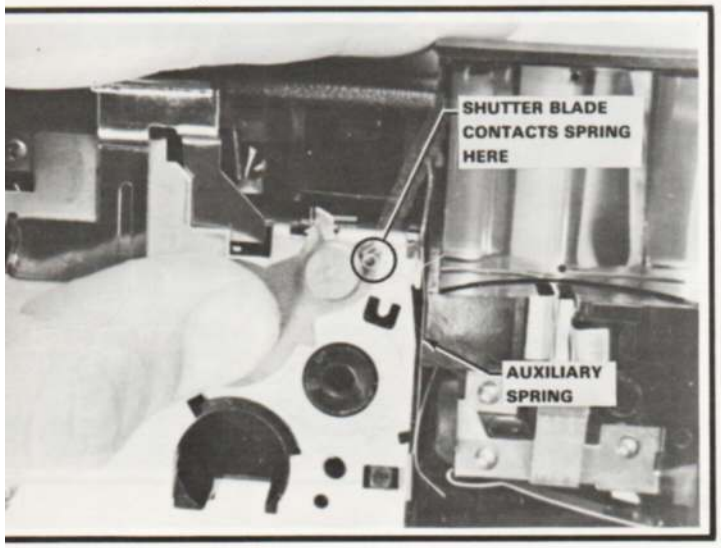


Figure 12

Figure 13

FLASH SYNC

Since flash synchronization is the subject of later lessons, it is only necessary at this time to be aware of the Instamatic parts used to fire a flashbulb. This shutter provides an "F" delay, i.e., it is synchronized for MF class bulbs.

The flash circuit is completed by another extension of the release lever, the vertical arm near the main lever. This arm presses against a contact strip on the flasholder assembly when the flasholder is extended, Fig. 13. When the release lever is depressed, it touches an extension of one of the **battery contacts,** completing a circuit from the batteries to the flasholder assembly. The contact from the release lever to the battery case can be more easily seen after removal of the mechanism plate.

FILM ADVANCE MECHANISM

Clutch Assembly:

As the wind lever is actuated, it turns the **wind gear,** Fig. 14, on top of the assembly. The wind gear then turns the plastic film **driver,** Fig. 15, through a **one-way clutch** to advance the film. Note that although the wind gear turns in both directions, always following the action of the wind lever, the one-way clutch permits the driver to turn only in the direction of film transit. This assures that the film will be driven positively in one direction while allowing the wind lever to return to its normal position. Clutch assemblies have many applications in photographic equipment and will be fully explained later in the course.

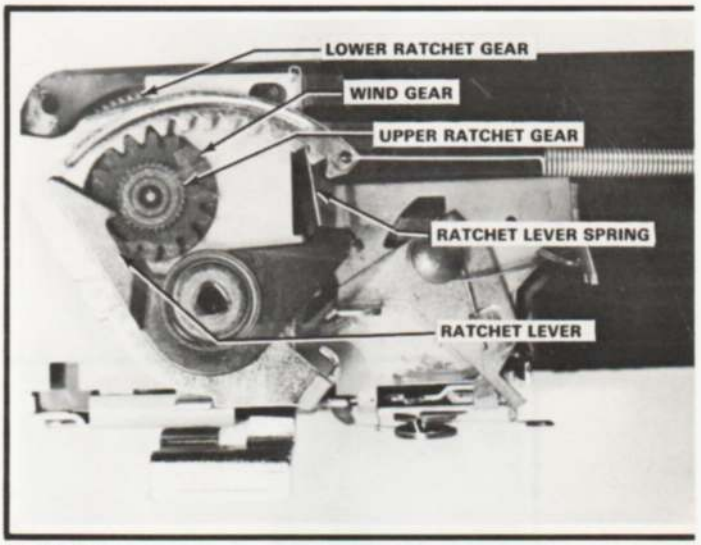


Figure 14

Upper Ratchet Assembly:

The wind lever must not be allowed to return until the shutter is cocked. Otherwise, the film could be brought into position without setting the main lever. This is assured by the ratchet and pawl assembly above the wind lever, Fig. 14.

The **upper ratchet gear** is part of the wind gear while the **ratchet lever** is riveted over the same pivot position as the wind lever. The pawl end of the ratchet lever engages the teeth of the upper ratchet gear on the setting stroke. Because the upper ratchet gear teeth are slanted, the gear assembly can turn freely in one direction, but the pawl end of the ratchet lever will prevent rotation in the other direction.

When the main lever has moved to the cocked position, its vertical lug will move the ratchet lever out of engagement, allowing the wind lever to return. Note the flat brass spring which moves the ratchet lever toward the ratchet, Fig. 14.

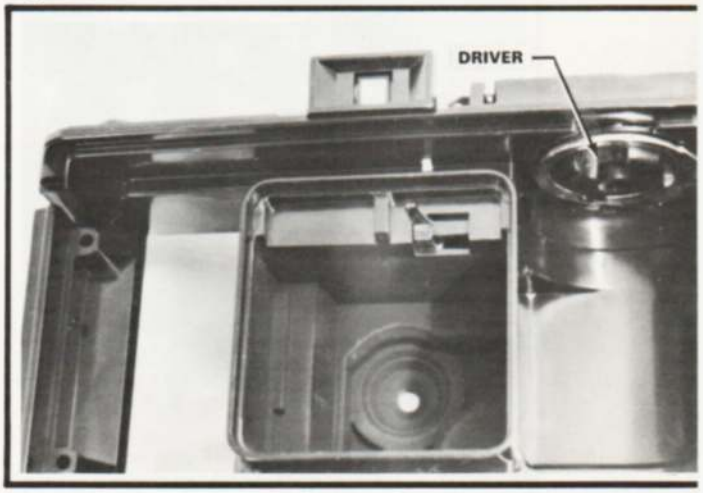


Figure 15

Locking Lever:

As you have already observed, the release lever is blocked before and after the winding operation until the perforation lever is actuated. The perforation lever unlatches the **locking lever** during the film transit (this action can be observed after further disassembly) which then moves by spring tension out of the release lever's path.

From the front of the assembly, the action of the release blocking extension of the locking lever can be observed. Note

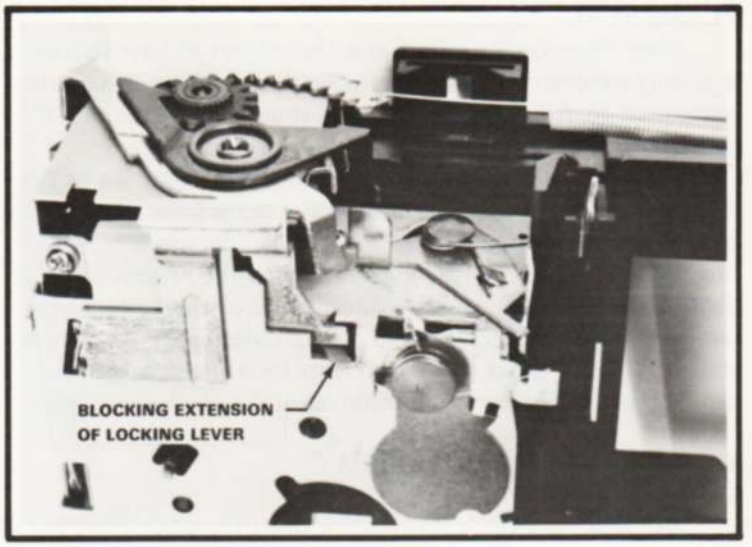


Figure 16

the lever which extends through a cutout in the mechanism plate near the shutter blade, Fig. 16. Operate the shutter following the proper sequence while watching the action of this locking lever extension. As long as this lever is under the release lever, the shutter cannot be tripped. You can now see why it was impossible to release the shutter without activating the perforation lever.

The teeth of another larger ratchet gear can be partially seen under the wind lever, Fig. 14. This ratchet is part of the one-way clutch assembly and can turn only in the direction of film travel. In this case, the pawl is provided by another extension of the locking lever. The vertical arm of the locking lever, which can be seen near the main lever, enters the film advance mechanism to engage the **lower ratchet gear.** The pawl end can be seen at a later stage of disassembly.

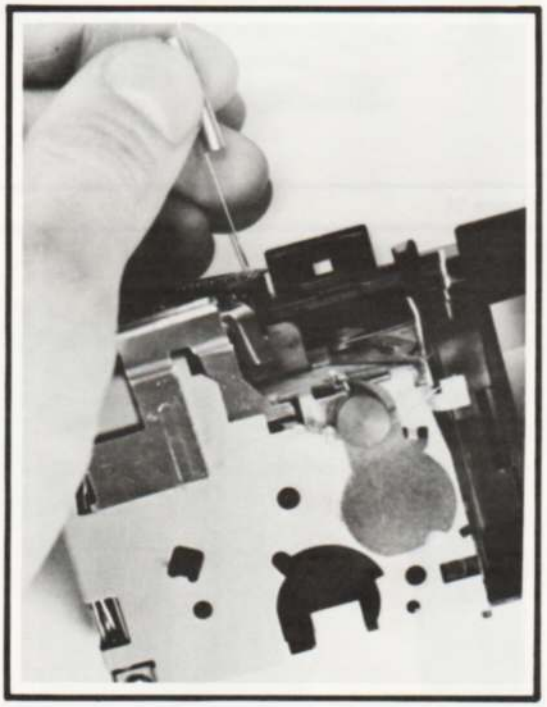


Figure 17

In the released position, the main lever holds the locking lever out of engagement with the lower ratchet gear. As the shutter is cocked, the locking lever follows the main lever under spring tension (the locking lever spring cannot be seen until the mechanism plate is separated from the camera body). It is then latched by the perforation lever. When the perforation lever is actuated, it releases the locking lever. The locking lever can then complete its movement, the pawl end falling into engagement with the lower ratchet gear and the release lever blocking extension moving behind the mechanism plate.

In this position, the locking lever prevents a repeated movement of the wind lever. When the shutter is released, the main lever will force the locking lever out of engagement with the lower ratchet gear, at the same time preventing a repeated action of the release lever.

PRACTICE MECHANISM DISASSEMBLY

Once you are familiar with the shutter operation, you can disassemble the practice mechanism.

The wind lever spring hooks to a plastic stud on the camera body. Holding the spring by the coils with the thumb

and index finger of your left hand, pull the spring toward the stud, at the same time lifting it up and free of the camera body. With the spring held in a vertical position, Fig. 17, lift it out of the hole in the wind lever.

Cock the shutter but do not actuate the perforation lever. Then, place the mechanism on the workbench with the focal plane down. Remove the two screws which secure the mechanism plate to the camera body, Fig. 18.

Before the mechanism plate can be separated from the camera body, it must be lifted slightly to clear two locating studs. Note the two studs - one square and one round - which extend through the mechanism plate near the shutter blade, Fig. 18. These studs are part of the camera body and help align the mechanism plate in the correct position. (In addition, the square stud normally secures the auxiliary spring, Fig. 12, which would be removed before the mechanism plate.)

Using your thumb, gently lift the bottom of the mechanism plate just enough to clear the two studs, Fig. 19.

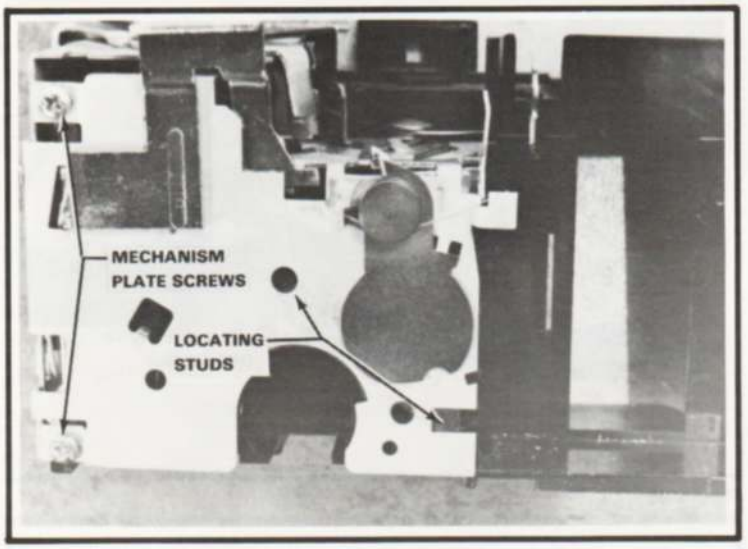


Figure 18

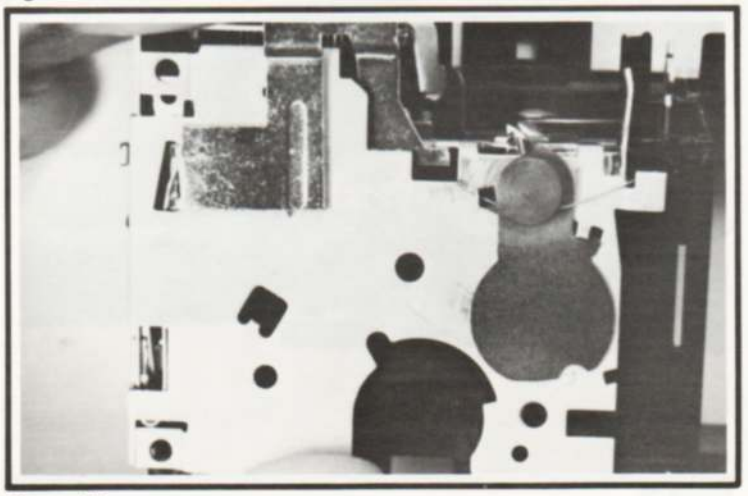


Figure 19

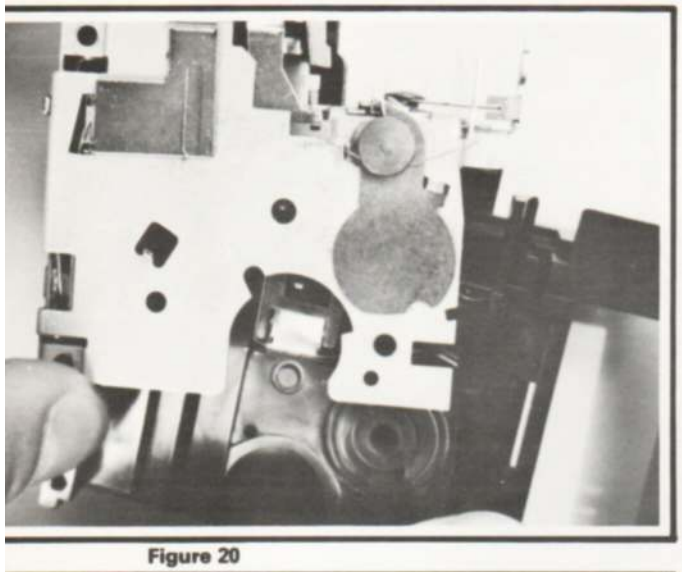


Figure 20

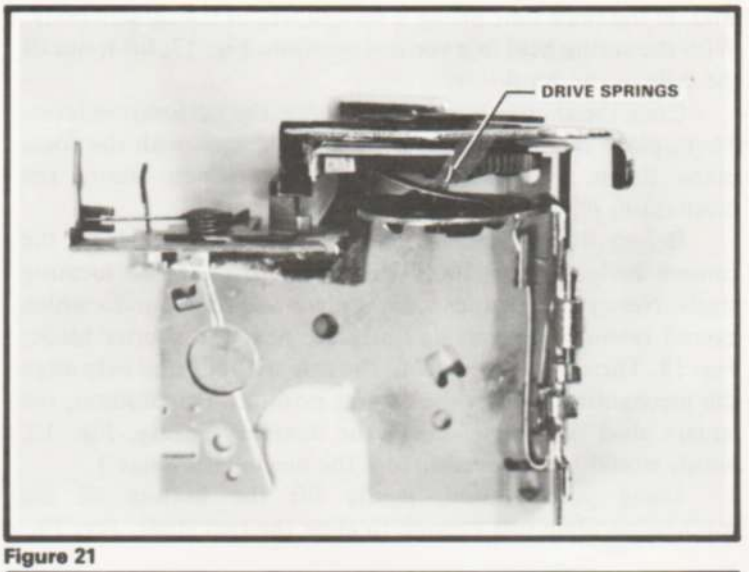


Figure 21

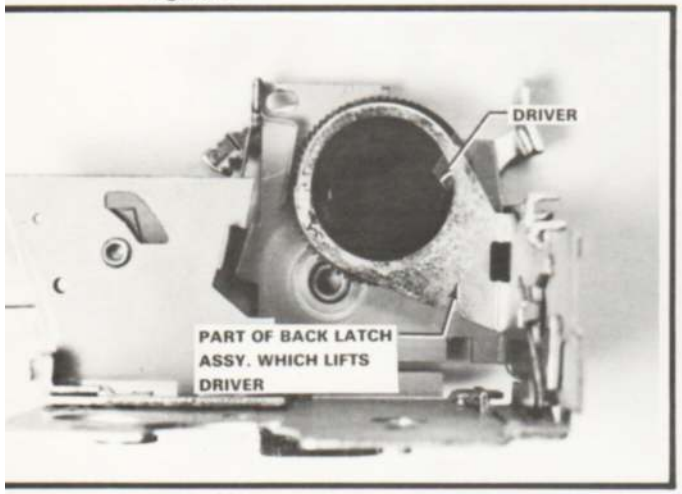


Figure 22

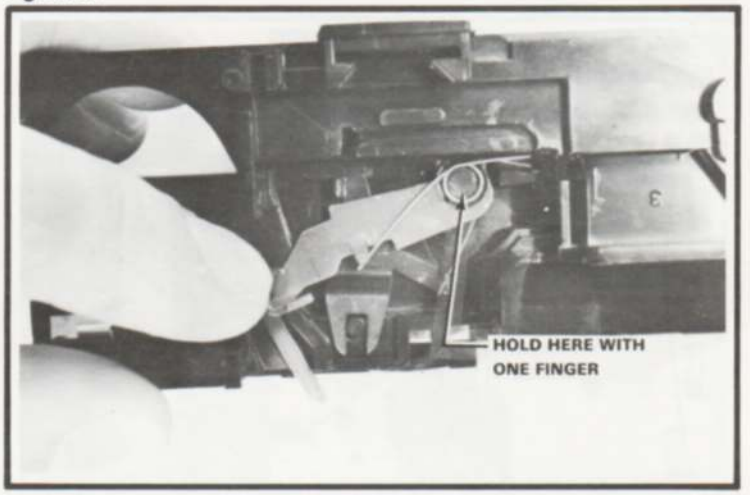


Figure 23

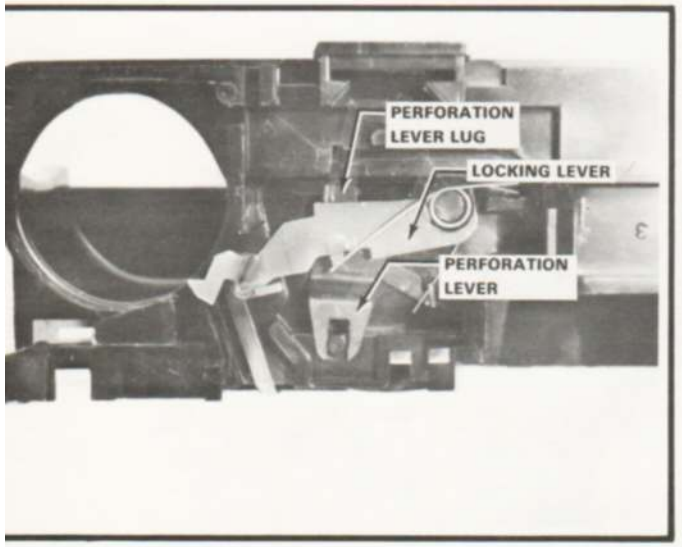


Figure 24

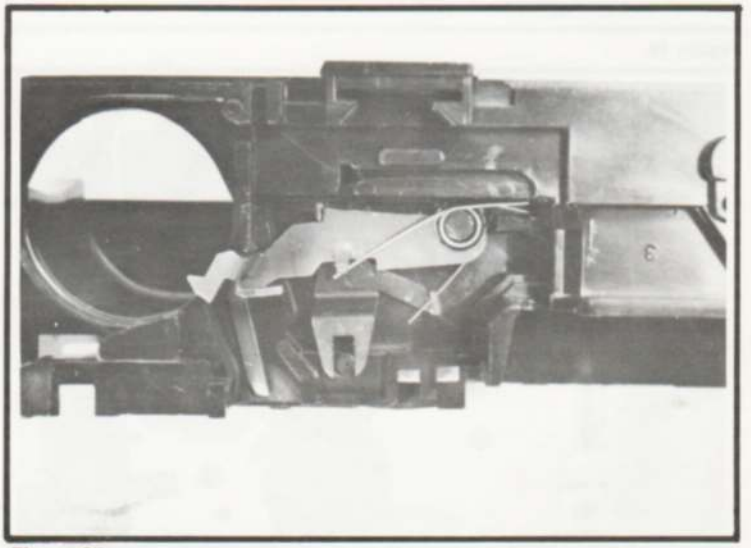


Figure 25

CAUTION:
Use extreme care in handling the mechanism plate. This metal is very soft and will bend easily.

With the assembly in an upright position, hold the plastic body with one hand and the mechanism plate with the other hand. Now carefully lift the mechanism plate straight up until it is free of the camera body, Fig. 20. Keep the plastic body in an upright position and place it to one side.

With the exception of the springs, the parts remaining on the mechanism plate are riveted in position and should not be disassembled. It is not necessary to remove the springs unless replacement is indicated.

CAUTION:
Do NOT release the shutter while observing the shutter and wind mechanism at this state of disassembly. The main lever is normally restrained by the camera body, and if released at this time will override its rest position. The parts are now in the correct relationship for reassembly.

The actions of the one-way clutch and **back latching mechanism** which were formerly hidden from view can now be observed. Note the two flat **drive springs** which extend from the lower ratchet gear to the plastic driver, Fig. 21. These springs serve a dual purpose: they turn the driver to advance the film and they provide a spring action when the driver is moved vertically by the latch.

Place the mechanism plate to one side and note the two levers remaining in the camera body. If you were sufficiently careful in disassembly, the locking lever and perforation lever should still be properly located with their two springs. If these positions were disturbed, reassemble the levers as in Fig. 24. You can now manually operate these levers to more clearly understand their functions.

Hold your finger over the locking lever spring at the brass bushing. Now move the locking lever as far as it will go toward the front of the camera, Fig. 23. This is the released position, where the lever would normally be held by the main lever.

Allow the locking lever to return under its spring tension. This will be the position after the shutter is cocked, Fig. 24. As the locking lever moves toward the rear of the camera, it contacts a lug on the perforation lever. This moves the perforation lever in the same direction, forcing the tail of the lever outward to where it can engage the film sprocket holes. Finally the lug on the perforation lever will reach the camera housing, holding both parts in this position.

Holding one finger over the forked portion of the perforation lever and one finger over the brass bushing, simulate the action of the film as done previously. When the perforation lever is moved in the direction of film travel, the lug will be moved until it reaches the notch in the locking lever. At this

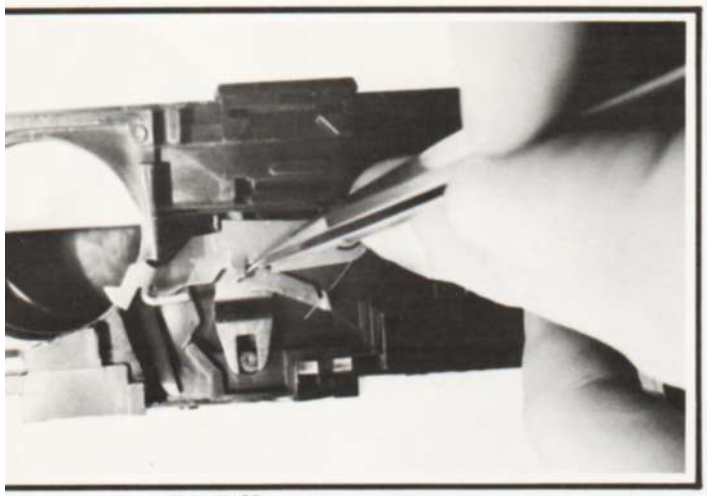


Figure 26

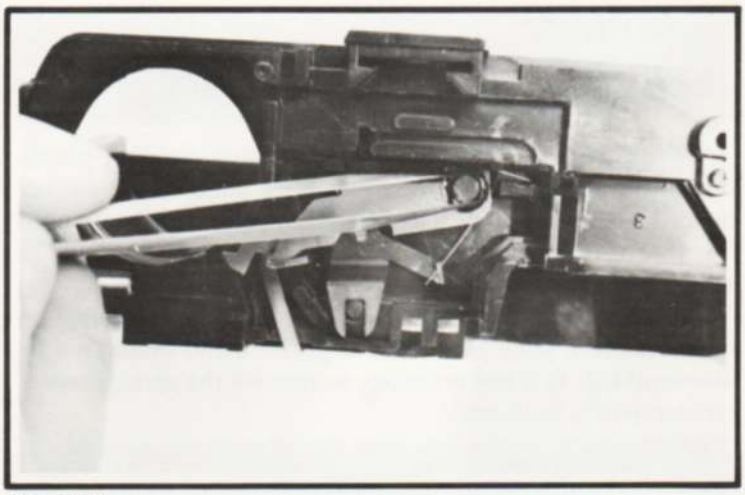


Figure 27

point, the locking lever will be allowed to drop into engagement with the lower ratchet gear and the shutter can be released.

When the shutter is released, the main lever will move the locking lever against its spring tension. The perforation lever will follow this movement by virtue of its own spring until the end of its forked portion is blocked by the plastic stud. The main lever will hold the parts in this position until the shutter is cocked, beginning the sequence anew.

The Instamatic disassembly can now be completed. Hold one finger over the locking lever spring during removal to prevent loss. Grasp the long end of the spring with tweezers, Fig. 26, pulling the spring toward the front of the camera body until it clears the stud on the locking lever. Now lift the end of the spring over the stud and let it come back to rest against the camera body. Lift the spring out of the camera body and set it to one side.

Using your tweezers, lift the brass bushing straight up to clear the plastic post, Fig. 27. The locking lever pivots on the same post and can be removed at this time.

The perforation lever and spring, Fig. 28, are all that remain to be disassembled. Note that the short end of the spring fits into a hole in the camera body. Grasp the long end of the spring with tweezers and disconnect it from the lever. Lift the spring out of the camera body.

Slip tweezers under the forked portion of the perforation lever and lift it off of the post. Tilt the lever during removal to clear the slot where the tail extends through the body.

It is not necessary to remove the battery contacts. You can now see, however, how the connection is made between the battery terminals and the release lever.

PRACTICE MECHANISM REASSEMBLY

Holding the perforation lever by the forked end with your tweezers, feed the tail through the slot over the focal plane. Lower the forked end over its post.

Place the short end of the perforation lever spring into the

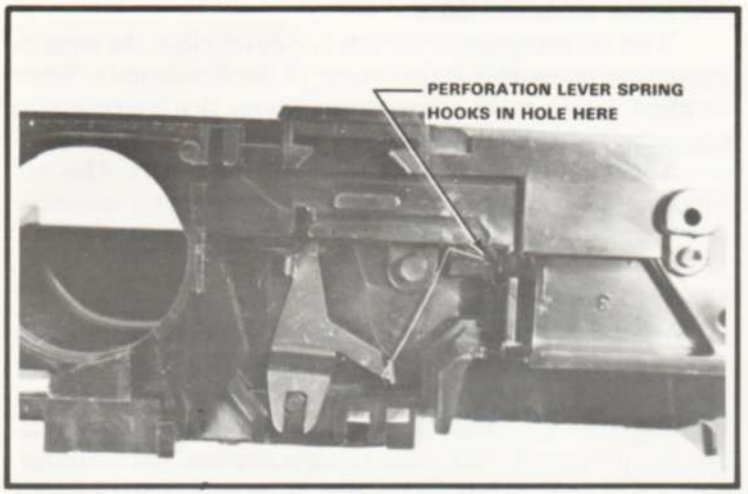


Figure 28

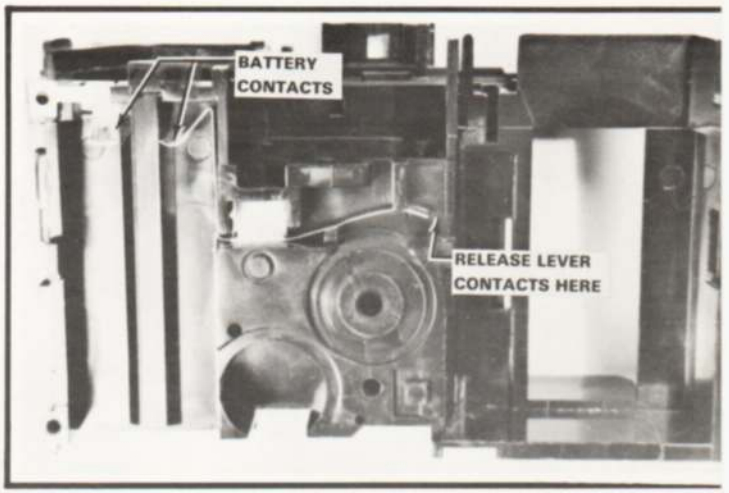


Figure 29

hole in the camera body. Make sure the spring is fully seated in its retaining groove and that the long end is against, not over, the lower shoulder of the locking lever post, Fig. 30. Use your finger to retain the spring in position while hooking it to the perforation lever.

Place the locking lever over its post. Next install the brass bushing, shoulder up, over the same post.

Set the coiled portion of the locking lever spring over the bushing, seating the short end of the spring alongside the perforation lever spring. Hold your finger over the spring while hooking the long end against the locking lever stud.

Make sure the parts in the camera body are fully seated before replacing the mechanism plate. In order for the locking lever to clear the ratchet, the perforation lever and locking lever should be in the positions shown in Fig. 24.

The shutter should still be in the cocked position. Holding both the camera body and the shutter mechanism upright, gently lower the shutter assembly into position. Tilt the mechanism plate so the main lever end is positioned first, Fig. 31, and then lower the wind lever end into location.

After the top of the assembly has been properly aligned, pull the front of the mechanism plate down slightly to position it over the two locating studs.

Before replacing the screws, actuate the perforation lever and release the shutter to make sure all parts are operating correctly. If the latching mechanism fails to function properly, the interior levers or springs have probably been dislodged. If this is the case, it will be necessary to remove the mechanism plate and reseat these parts.

When you are certain that everything is operating correctly within the body, and that the mechanism plate is properly seated, replace the two screws.

To replace the wind lever spring, insert the straight portion of the end of the spring into the hole in the wind lever. Again grasp the coils and pull the spring over the stud. While holding the spring in this position, use a screwdriver blade to seat the loop over the stud.

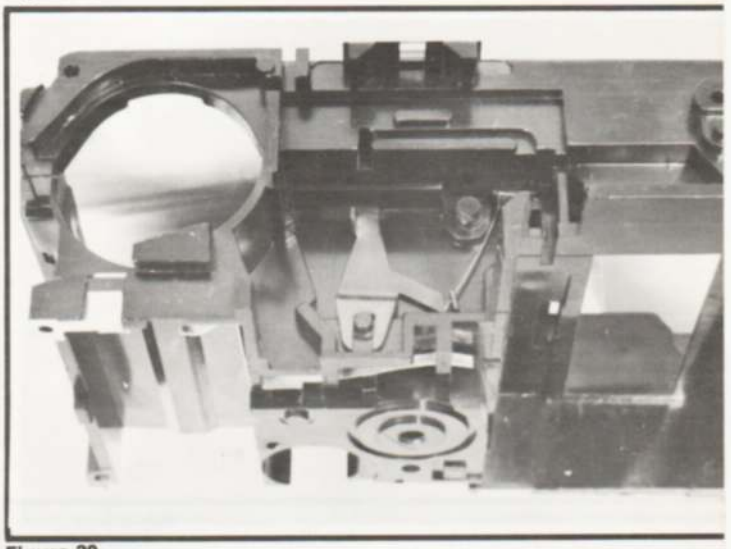


Figure 30

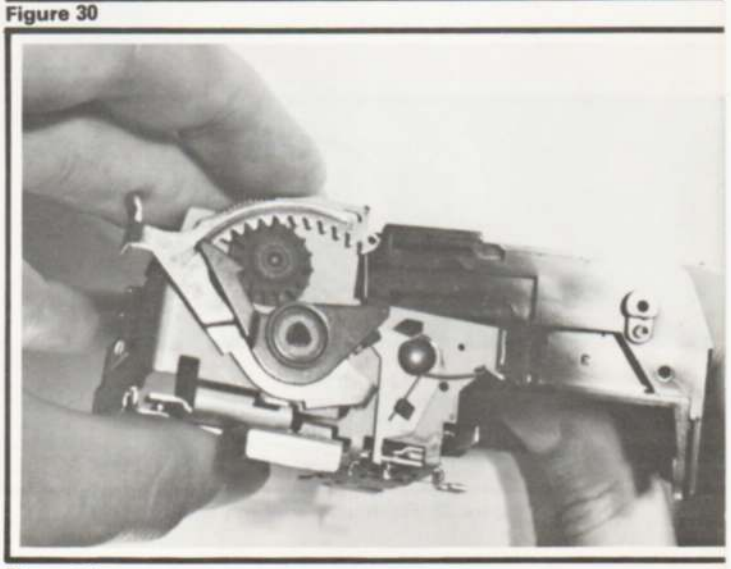


Figure 31

CAMERA REASSEMBLY

With the exception of the rear top cover plate, the remaining camera reassembly is the reverse of the disassembly. When repeated testing of all components assures that everything is operating correctly, recement the rear top cover plate in position, using Pliobond or similar rubber base adhesive. This will eliminate the necessity of having to again remove a cemented part if anything should prove to be malfunctioning.

SERVICING TIPS

Whenever a camera repair is completed, the film transport should be checked with a test roll of film. This test, especially valuable with the Instamatic because of the action of the perforation lever, is virtually a necessity with motor drive models. For this purpose, Kodak manufactures a special test cartridge, part #1107, which can be ordered from National Camera's Parts Department. To check the camera operation, the test cartridge is inserted in the normal manner of loading film. A slotted shaft allows rewinding the "film" in the cartridge for the next test.

Once you understand the techniques involved with the Instamatic 100 you will be well equipped to handle many other models in this series. For instance, the popular 104 is practically identical, the only difference being that it is adapted to handle flashcubes rather than individual bulbs.

Other models offer a variety of refinements to the basic design. Automatic exposure control, motor drive, and automatic film programming for different ASA's are a few of the extras which have been incorporated into the simple Instamatic. Except for exposure meters which are covered in a later lesson, the various Instamatic refinements are easily understood upon observation and analysis.

Figure 32 Flashcube adapter, Instamatic 104

One malfunction that is common to this design after the camera has been in use for a period of time is a loss of tension on the ratchet lever spring. One end of this spring actuates the ratchet lever while the other end maintains pressure against the lower ratchet gear (see Fig. 22). If the tension on the lower ratchet gear is insufficient, more than the normal one and one-half strokes may be required to advance the film.

The first stroke of the wind lever cocks the shutter, moving the ratchet lever out of engagement with the upper ratchet gear. The second stroke moves the film the additional amount necessary to trip the perforation lever. After the first wind lever stroke, as the wind lever is returning, the film can back up in the cartridge unless the lower ratchet gear is properly restrained by the ratchet lever spring. If this condition is severe, the film can back up the same amount it is advanced, never coming far enough to trip the perforation lever. Reshaping the ratchet lever spring to increase its pressure on the lower ratchet gear will correct this condition.